Sub a1

WHAT IS CLAIMED IS:

1. An input device for providing information with a data processing system, comprising:

means for containing fluid medium in a hermetically sealed manner; (312, 308, 310)

means for communicating said fluid medium going out from or coming into said containing means; (314, 316)

means for restricting flow of said fluid medium passing through said communicating means; (324; see Col. 7, lines 55-62, 325)

means for applying pressure to said fluid medium responsive to direct or indirect inputs from an operator so as to change volume of said fluid medium contained in said containing means, thereby said fluid medium is passed through said communication means; (see Column 4, lines 40-49)

means for generating (318) control information responsive to operation of said pressure applying means by the operator, said generated control information being input to said data processing system; and (see col. 4, lines 22-30)

means for generating feedback information responsive to said control information input from said control information generating means, said feedback control information being fed to said restricting means; (see Column 4, lines 9-21)

whereby said restricting means restricts the flow of said fluid medium through said communication means responsive to said feedback control information fed by said feedback information generating means. (see col 4, lines 9-21)

2. An input device for providing information with a data processing system as set forth in claim 1, wherein said communicating means comprises a conduit for conveying said fluid medium. ('341, (325))

3. An input device for providing information with a data processing system as set forth in claim 2, wherein said restricting means comprises a voltage driven actuator arranged in said conduit for varying a cross-section of said conduit to restrict the flow of said fluid medium therethrough.

4. An input device for providing information with a data processing system as set forth in claim 1, wherein said fluid medium is an electroviscous fluid.

5. An input device for providing information with a data processing system as set forth in claim 4, wherein said restricting means comprises a set of electrodes for applying a regulating voltage so as to varying viscosity of said electroviscous fluid as passing through said communicating means.

6. An input device for providing information with a data processing system as set forth in claim 1, wherein said containing means and pressure applying means comprise a cylinder containing said fluid medium and a piston fit thereinto respectively, said piston enabled to be urged by the operator.

7. An input device for providing information with a data processing system as set forth in claim 1, wherein said containing means comprises a chamber defined by a shell, said shell having an elastic membrane at at least one portion thereof

thereby said elastic membrane configures said pressure applying means.

8. An input device for providing information with a data processing system as set forth in claim 1, wherein said control information generating means comprises means for detecting a position and/or a displacement provided by the operator mechanically.

9. An input device for providing information with a data processing system as set forth in claim 1, wherein said control information generating means comprises a pressure sensor for said fluid medium contained in said containing means and a circuitry for transmitting an electrical signal generated by said pressure sensor to said data processing system, thereby operation of the operator is input to said data processing system as an electrical signal representing change of pressure of the fluid medium in said containing means.

10. An input device for providing information with a data processing system as set forth in claim 1, wherein said feedback information generating means comprises a circuitry for transmitting an electrical signal representing the feedback information to said restricting means.

11. An input device for improving man-machine interface comprising:

a sealed chamber connected to a restrictor pipe which serves as a passageway for fluid flow from or into said chamber;

a control movement transmission mechanism wherein direct or indirect control inputs from an operator result in changes

in the volume of fluid in said chamber, said changes being induced by an inflow or outflow of fluid through said restrictor pipe;

a control data generation means capable of physically monitoring the operation of said control movement transmission mechanism and converting that operation into corresponding electrical signals;

a transmission circuit through which the signals generated by said control data generation means are fed to a host device;

a fluid flow variable restriction means capable of electrically and variably controlling the fluid flow status in said restrictor pipe; and

a receiver circuit capable of driving said fluid flow variable restriction means through the application of a control response signal applied to said restriction means from said host device.

12. An input device as set forth in claim 11, wherein said control movement transmission mechanism includes a manually operable lever capable of pivotal angular movement along two axes and further includes two separate lever control movement transmission mechanisms which comprise a control movement transmission system, each of said mechanisms operating in response to one axis of lever movement, and each separately equipped with said chamber connected to said restrictor pipe, control data generation means, transmission circuit, fluid flow variable restriction means, and receiver circuit.

13. An input device as set forth in claim 11, wherein an electrical voltage driven actuator is installed to a part of said restrictor pipe, electrical displacement changes of said voltage driven actuator being used by said fluid flow variable restriction means to control the volume of fluid flowing through said restrictor pipe.

Sub 94

14. An input device as set forth in claim 11, wherein an electroviscous substance is utilized as said fluid, and whereby said fluid flow variable restriction means applies an electrical voltage within said restrictor pipe in a manner to induce a viscosity change in said electroviscous substance.

15. An input device as set forth in claim 11, wherein said chamber is structured as a cylinder and piston assembly, and a manually operable lever is installed to said control movement transmission mechanism as a means of changing the displacement of said cylinder through movement of said lever.

16. An input device as set forth in claim 11, wherein an outer surface of said chamber comprises an elastic member, said member being structured so as to be directly or indirectly operable by the operator in a manner which induces a volumetric change in said chamber.

17. An input device as set forth in claim 11, wherein an outer surface of said chamber comprises an elastic member, the surface of said elastic member being operable by means of the lever of said control movement transmission mechanism in a manner as to induce volumetric changes in said chamber.

Sub a4 Cont

18. An input device as set forth in claim 11, wherein said control data generation means is capable of monitoring the mechanically moving parts of said control movement transmission mechanism or the displacement changes caused thereby.

19. An input device as set forth in claim 11, wherein said control data generation means is capable of monitoring the pressure within said chamber.

20. An input device as set forth in claim 11, further comprising means for returning said control movement transmission mechanism to a base point position, and for returning the fluid volume in said chamber to an initial volume, at a time when control pressure from the operator is not being applied to the control movement transmission mechanism.

21. A pointing device for inputting data to a computer, comprising:

a sealed chamber connected to a restrictor pipe which serves as a passageway for fluid flow from or into said chamber;

a transmission mechanism for transmitting inputs from an operator to said chamber so as to cause changes in the volume of fluid in said chamber, said changes being induced by an inflow or outflow of fluid through said restrictor pipe;

a monitoring device capable of physically monitoring the operation of said transmission mechanism and converting that operation into corresponding electrical signals;

a transmission circuit through which the signals generated by said monitoring device are fed to the computer;

a fluid flow variable restriction device capable of electrically and variably controlling the fluid flow status in said restrictor pipe; and

a receiver circuit capable of driving said fluid flow variable restriction device through the application of a control response signal applied to said restriction device from said computer.

22. A video game controller incorporating the pointing device claimed in claim 21.